

RESOURCES-BURDEN-PROCESS-EFFICIENCY ASSETS-VALUE-USE-EFFECTIVENESS

**HUMAN
RESOURCES
ALLOCATION
PRODUCTIVITY
and
INFORMATION
MANAGEMENT**

William H. Price
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HUMAN RESOURCES ALLOCATION

A few years ago, offices were requesting additional staffing. More people were needed to address growing workloads, and arrest backlogs.

The justification was defensible, but the request was denied.

The next year, the request was resubmitted. There was the feeling that it was hopeless--and it was.

The following year, there was a different attitude--don't even try! Most offices knew that additional staffing was out of the question. Priorities were elsewhere.

A year later, there was another change in attitude. Offices were now facing cuts and loss of staff.

In 1981, the question of staff cuts shifted to termination of entire programs.

If these trends are not familiar, the message is:
"Where burdens exceed value, the program must go."

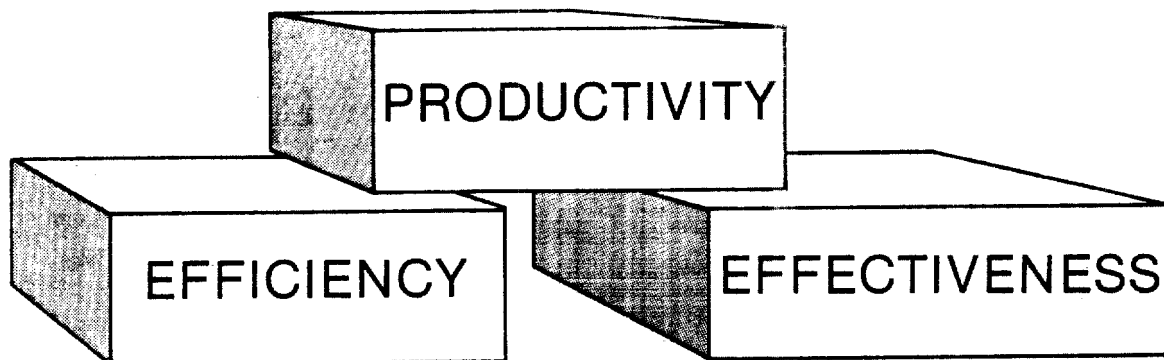
If valuable programs are to survive, then there must be smarter ways of achieving program objectives.

Simply stated, this message translates to "produce or perish."

The noble objective of improving staff productivity is no longer an issue.

The new issue is how can productivity be increased with the staff that remains.

If this cannot be done, then burdens outweigh the value. The function or program must go!



Increased productivity is one of the major objectives of resource allocation.

The building blocks of productivity are:

- EFFICIENCY in office processes,
- AND
- EFFECTIVENESS in achieving program objectives.

The office environment is an information factory.

The methods of handling information directly impact efficiency.

The information itself, and how it is used, strongly influences effectiveness.

The information environment is radically changing.

Three decades ago computing belonged to the agency. It was limited to a select few functions such as payroll, personnel, and accounting.

In the 1980s, computing and communications power will be dispersed to the far corners of the organization. These facilities will belong to the office masses.

Will this simply be a revolution in hardware technology, or will it be a revolution in allocation of resources and increased productivity?

Information policy, and management of information in a coherent architecture will determine the answer.

INFORMATION MANAGEMENT ASSETS-RESOURCES

"Information Management" or "Management of Information Resources" is an emerging and still definitional concept.

I would like to share with you some ideas about how this relates to productivity and allocation of human resources.

Some of these ideas and definitions may differ from those that you have already encountered. The underlying theme today will be information and its relationship to productivity.

I will review with you:

- Magnitude of information activities and consequential burdens.
- The difference between information assets and information resources and how both influence productivity.
- The necessity for addressing the life cycle of information to maximize returns from investments in resources.
- And finally -- I will give you an example of a conceptual system that addresses life cycle requirements to offset the demands for human resources.

INFORMATION ACTIVITIES

- DOMINATING
- PERVADING

Information activities dominate many organizations.

The needs for information and their attendant activities can be found in almost every office of an agency or corporation.

In our own economy, nearly 50% of the national workforce is engaged in information or information related activities.

In some respects, we are becoming an information society.

Information costs, though not readily identifiable, are major items in most agency budgets.

These costs go beyond over the counter information operations. They are deeply imbedded in every office activity.

Unlike food that is sold in a market or restaurant, information does not come with a price tag that represents the costs of cultivating, processing, preparing and packaging.

But information exchanged across a conference table, in person-to-person contacts, or in briefing papers, has traveled a long route similar to that of the food process.

Information activities and associated costs are major elements underpinning every agency budget.

U.S. DEPARTMENT OF STATE



The Department of State is an example of an information intensive organization.

Information is essential to the conduct of foreign relations.

Every day, some 3,000 messages are exchanged with more than 200 posts around the world.

These messages include reporting on exchanges, negotiations, political and economic developments between the United States and foreign governments. Additionally there are a myriad of transactions in administrative matters that are regulated by an equal number of laws, regulations, policies, and rules.

SPEED OF EXCHANGE

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TRANSMISSION

186,000 miles per second



This message volume travels electronically around the world at 186,000 miles per second. And importantly, these messages are untouched by human hands during transit.

Once this information comes out of the air and is turned to paper, it moves by hand at the glacial speed of 250 feet per day. Suspending a human bridge in space to pass paper to and from posts would not be an effective nor a practical solution. The electrical mode of exchange may therefore be a model for office efficiency.

Let's compare the efficiencies of electronic communications to moving the same volume of information the same distance on paper.

MESSAGE

(ANNUAL)

AIRGRAMS	30,230
COPIES DISTRIBUTED	2,418,400
HANDLING STEPS	120
ESTIMATED HANDLINGS:	
BEFORE REPRODUCTION	701,340
AFTER REPRODUCTION	66,759,270
TOTAL	67,460,610
PEOPLE	16

Airgrams are a paper -- rather than an electronic -- mode of exchanging information. They are carried by diplomatic pouch between the State Department and overseas posts.

Fortunately, airgrams represent less than 4% of the total message volume.

But look at the quantity of paper copies generated by so few messages -- 2,418,000 distribution copies for 30,000 airgrams.

To move a paper airgram from its origin in the Department to in-boxes overseas requires 120 different handling steps.

A small number of these handling steps are applied to the original airgram before it is reproduced. This generates 701,000 human handlings for the 30,000 originals.

But look at the handlings required after these airgrams have been reproduced for distribution -- 66 million human handlings for 2.4 million copies.

The copy ratio is 80:1, and 99% of the work is required after copies have been reproduced. The excessive demands of paper are clear.

The quantity of messages may be trivial, but the copies and demands on human resources are excessive.

Where an electronic message might travel 5000 miles untouched by human hands, an airgram may be handled by 3 different people to move no more than 40 feet.

MAGNITUDE (HOLDINGS-1978)

DEPARTMENT

FILE CABINETS	25,000
ESTIMATED PAGES	226,000,000

POSTS

FILE CABINETS	22,000
ESTIMATED PAGES	199,000,000

Some 1 million messages per year result in over 144 million paper copies for distribution.

When information is shared by paper -- rather than electronically -- the impact is reflected in paper file holdings.

Let me give you a moment of silence to reflect on the human effort demanded to file, maintain, and use a total 425 million pages of paper. (PAUSE)

How much of this effort is redundant -- filing and maintaining 30 or 40 copies of the same information?

With offices dispersed not only in a 2 square block seven story building, but at some 200 overseas missions, it is impossible for all interested parties to share a single piece of paper.

But a single, computerized file cabinet of migratory electronic information can be shared by hundreds of users.

Paper volume cannot be efficiently managed. After paper is proliferated, there are not enough human resources to exercise control, screening, and disposal of duplicates and papers that no longer have value.

Most Federal agencies, equally dependent on information, face similar problems in paper volume.

The related information activities are dominating and pervading.

Since information is so vital to the operation of government, the primary objective of information management is . . .

OBJECTIVE

INCREASE PRODUCTIVITY

- MORE EFFICIENT INFORMATION PROCESSES
- MORE EFFECTIVE SUPPORT WITH INFORMATION

To increase productivity by:

1. Making information processes more efficient so that costs and demands for human resources can be reduced,

AND

2. Supporting executives and decisionmakers with information sharpen their effectiveness.

OR PUT ANOTHER WAY - REDUCE THE INFORMATION BURDENS WHILE CONCURRENTLY MAINTAINING OR INCREASING THE VALUE OF INFORMATION.

On the one side of the information coin, inefficient processes produce excessive and unnecessary demands for human resources.

On the other side, marginal information support reduces the effective contribution that can be made by executives and decisionmakers.

PRODUCERS

- OFFICE AND CLERICAL
WORKFORCE
- EXECUTIVES AND DECISION
MAKERS

There are two types of producers in the office:

- Those who handle and process information -- the office workforce.
- AND secondly, those who use or apply information -- the executives and decisionmakers.

The first group is larger -- by an order of magnitude -- than the second. Agency wide, the ratio may be 80 or 90:1, or even higher.

The government does not manufacture automobiles or produce petroleum.

Its products are decisions that set national policy, regulate, enforce, or provide benefits.

Decisions that set policy and initiate actions are dependent on information, AND information does influence productivity and effectiveness of the Federal establishment.

FACTORS INFLUENCING PRODUCTIVITY

- INFORMATION RESOURCES
- INFORMATION ASSETS

Allocation of information resources,

AND

Utilization of information assets are the two basic factors that influence productivity.

Allocation of information resources deals with efficiency and thereby influences productivity of the office workforce--those who handle and process information.

Utilization of information assets influences the effectiveness and consequential productivity of the knowledge worker--the decision maker.

Resources deal with efficiency, and assets contribute to effectiveness. These are the two basic factors that influence productivity in the office environment.

Let me make clear at this point the difference between information resources and assets by using an analogy.

The steam shovels, trucks, and labor used to mine, transport, and refine copper are being defined here as resources consumed in the process.

The copper, produced by this process, is the asset. Processing information and data consumes resources. The resulting information is the asset.

INFORMATION RESOURCES.

- PEOPLE
- EQUIPMENT
- SUPPLIES
- DOLLARS

These are the basic resources consumed by information activities.

The common denominator is the dollar cost.

Just as coal is consumed to produce energy that runs the plants to make cars,
these resources are consumed to produce information assets.

INFORMATION RESOURCES

- PRODUCE THE BURDEN
- INFLUENCE PRODUCTIVITY
OF THE OFFICE WORKER

The consumption of resources by information activities produces burden.

Depending on the mix of resources and how they are applied, these resources influence productivity of the office workforce and the magnitude of burden.

Misapplication of resources can diminish returns on the investment and increase burdens.

However, if resources are properly allocated and applied in an integrated and efficient manner, productivity can be increased and burdens reduced.

LET'S LOOK AT THE OTHER SIDE OF THE INFORMATION COIN -- THE ASSETS.

INFORMATION ASSETS

- DATA
- INFORMATION

The assets -- the data and the information itself -- are the products of information activities.

The objective of the information process -- as it consumes resources -- is to produce the assets -- the information that is used.

INFORMATION ASSETS

- CONTRIBUTE VALUE
- INFLUENCE PRODUCTIVITY
OF THE KNOWLEDGE WORKERS-
DECISION MAKERS

Information is an asset. It is collected, maintained, and used to contribute value.

These assets can contribute value by:

- 1) increasing knowledge about issues, and
- 2) by influencing the right decisions and actions at the right time.

Where consumption of information resources deals with process efficiency and burdens, the availability of information assets and the utilization of these assets contribute to value the effectiveness of the decisionmaker.

INFORMATION VALUE

- TIMELY
- RELEVANT
- ACCURATE
- COMPLETE
- CONTRIBUTION

But the value of information can be tenuous.

Lacking any of these attributes, the value of information is reduced.

But even if all these attributes are present--the bottom line for value is contribution a contribution to achievement of the organization's mission.

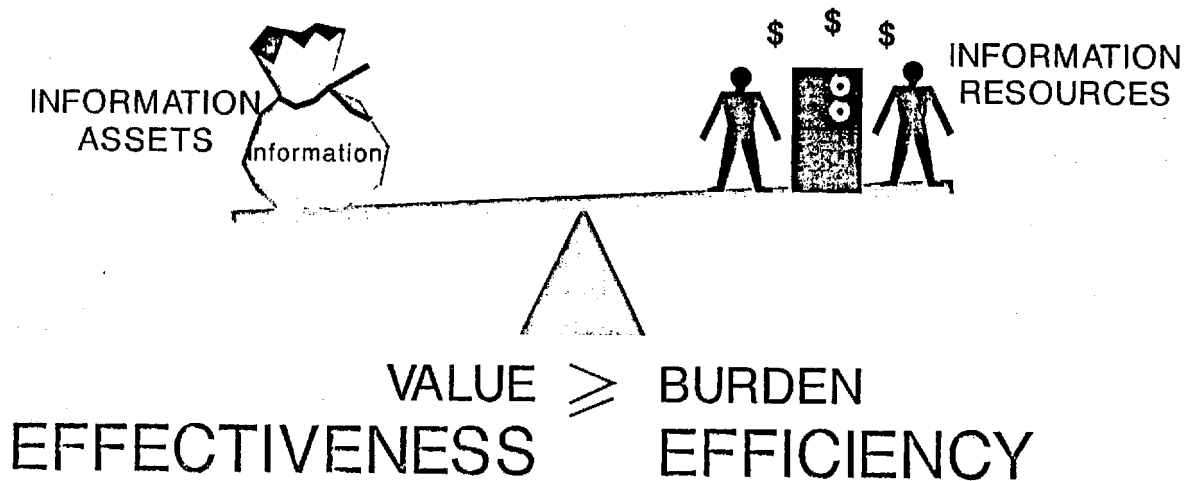
The right information must be available, it must be identified, and it must be used at the right time.

Information can produce KNOWLEDGE ENERGY.

Information is POWER.

This POWER can produce VALUE, and the value is INCREASED EFFECTIVENESS.

INFORMATION MANAGEMENT



Information Management is thus a balancing act between the assets and their value, and the resources and their burdens.

Value is increased when information assets contribute to effectiveness.

Burdens are reduced by more efficient processes that lessens demands on information resources.

Value or potential value of the assets should outweigh the resource burdens.

IS THERE A SIMPLE FORMULA FOR BALANCING VALUE AND BURDEN?

AN EQUATION?

$$A - R = NV \quad \sum \begin{matrix} R_1 \\ R_n \end{matrix} < A$$

- RESOURCES - IDENTIFIABLE, QUANTIFIABLE
- ASSETS - VALUE SUBJECTIVE, NOT READILY MEASURABLE

Unfortunately, there is no mathematical formula for management.

Asset value (A) less resource costs (R) is not a simple exercise that will produce net value.

Nor can we easily sum resource costs to determine if they are less than asset value.

Resources are measurable and can be reduced to dollar costs.

But value of information is not as easily derived.

Measuring value of assets must rely on programmatic judgement. Value requires an entirely different calculus than that used for resources. In a restaurant, the diner is often a better judge of food than the cook, or a third party.

But, where value questions may be difficult to resolve, resources can be managed to reduce burdens.

A key option for information management -- given value -- is to reduce the burdens of information activities while sustaining the value of the information.

Let's look at some of the activities that demand resources and produce burdens.

INFORMATION ACTIVITIES

(OFFICE WORKER)

- DICTATION
- COMPILING
- TYPING
- COMMUNICATING
- COPYING
- ROUTING
- FILING
- RECALLING
- PURGING

These information activities are not limited to clerical workers. Professionals are often engaged in finding, compiling, packaging, repackaging, and presenting information.

In a paper bound or paperwork intensive office, these activities place excessive demands on human resources.

The demands of these activities often subtract from performance of other activities.

EFFECTIVE SOLUTIONS

- ADDRESS INFORMATION LIFE CYCLE
- MAXIMIZE SOURCE DATA AUTOMATION
- INTEGRATE PROCESSES

Significant reductions in burdens and demands on scarce human resources can be reduced by addressing those activities that are applied to information from its inception and transit to its demise -- the life cycle of information.

Information, from the time it is created, does have a predictable life. And until some final disposition is made, information in various stages of this life span will demand resources.

If resource demands are to be reduced, effective solutions must address information in the context of its life cycle.

Solutions at the source (or point of creation) are the most effective, provided they are integrated with subsequent steps or activities in the cycle.

Remember source data automation during the mid-1950s? This was the concept of capturing information when it was created and then providing this information, in digital form, to other steps in the life cycle. The objective of source data automation was to reduce redundant manual handling. In those days, it was done with punched paper tape. Today it is accomplished with point-of-sale terminals or word processors.

But a source data solution is ineffective if the capture of information is not integrated and shared with other activities in the life cycle.

Stand-alone word processing is the key example of an ineffective solution. Information is captured in digital form, but the product is paper. And this labor intensive paper product is used by the remaining steps in the life cycle. The word processing solutions available today are technically superior to those of the 1950s. But they are often applied in an 1880 context -- the decade when the typewriter was born. Instead of source data automation, there is source data destruction of electronic media -- the reversion to paper and loss of the electronic resource. This is the most ineffective use that can be made of this valuable tool.

INFORMATION LIFE CYCLE

- CREATE
- COMMUNICATE
- USE
- MAINTAIN
- RECALL
- REUSE
- REPACKAGE
- RECOMMUNICATE
- DECLASSIFY
- DISPOSE

The life cycle of information is predictable. All of the steps or activities in this cycle are interrelated and interdependent.

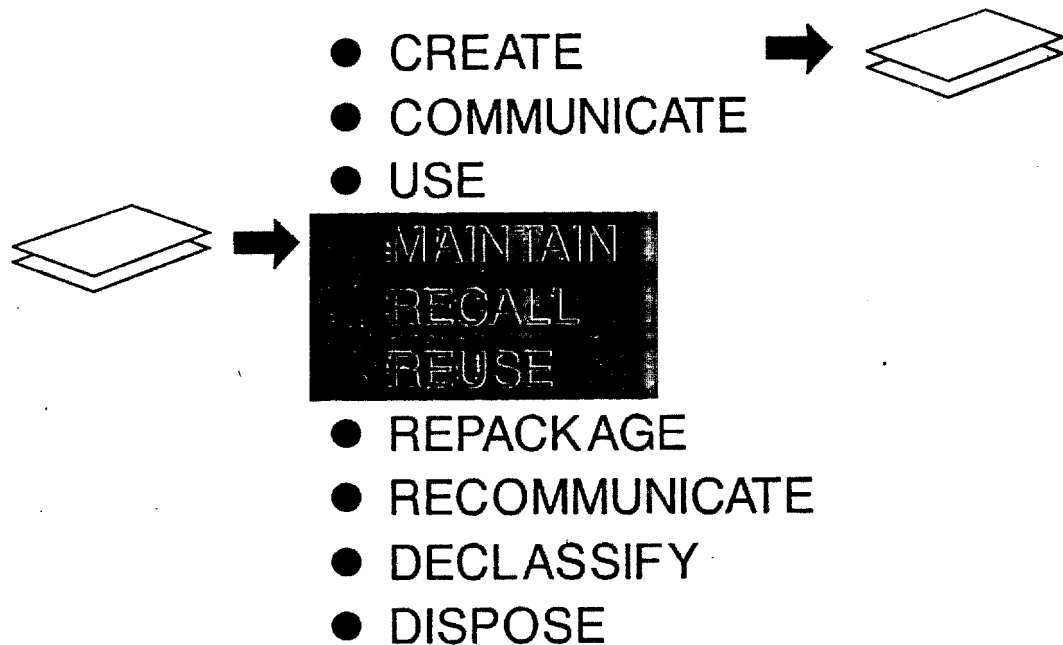
They are not isolated, nor are they random events.

From the point of creation to final disposition, the predictable flow of information demands resources.

Each activity in the cycle adds to the overall burden -- the cost of information. Isolated solutions to an integrated chain of events produce marginal returns on the investment.

There are no economies with proliferation of paper. Paper excessively demands the most scarce resource -- human resources. Electronic media, rather than paper, can reduce these demands and increase productivity.

INFORMATION LIFE CYCLE



There is a rule: The closer information solutions are applied to the beginning of the life cycle, and the more integrated these solutions are with subsequent activities, the greater the payoff or return on the investment.

This illustration does not depict an effective solution. The solution has been applied midway in the life cycle to maintenance of electronic files and the recall of information.

For the most important first step -- creation -- source data automation has not been used. The output is paper and this paper demands human intermediaries in subsequent steps.

Not only are human resources demanded by paper, this human intervention will create unnecessary delays in communicating information.

Since created information is not available in electronic form, paper output from the first step must be used by subsequent steps in the life cycle.

And to capture this paper information for electronic file maintenance and subsequent recall, requires redundant investment in keying or optical scanning.

This example is typical of many of today's word processing installations.

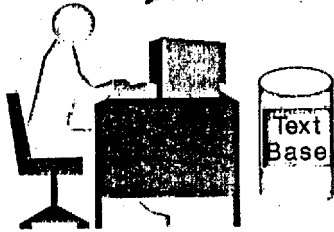
As shown here, the product of creation is paper -- not electronic media for interchange. Remaining steps in the life cycle do not benefit from the efficiencies -- the leverage -- of electronic media.

Interdependent activities require integrated solutions.

LET ME PAINT YOU A PICTURE OF TODAY'S EMERGING LIFE CYCLE INFORMATION SYSTEM.

CREATE INFORMATION

- [TYPE DRAFT]
- [REVISE AND CORRECT]



Word processing is the first step to life cycle solutions and maximizing returns on the investment, provided this valuable resource is integrated with the life cycle.

Word processing unto itself cannot fully justify the investment.

Word processing as source data automation can maximize returns on the investment and increase productivity. It must be used as a lever for other activities in the life cycle.

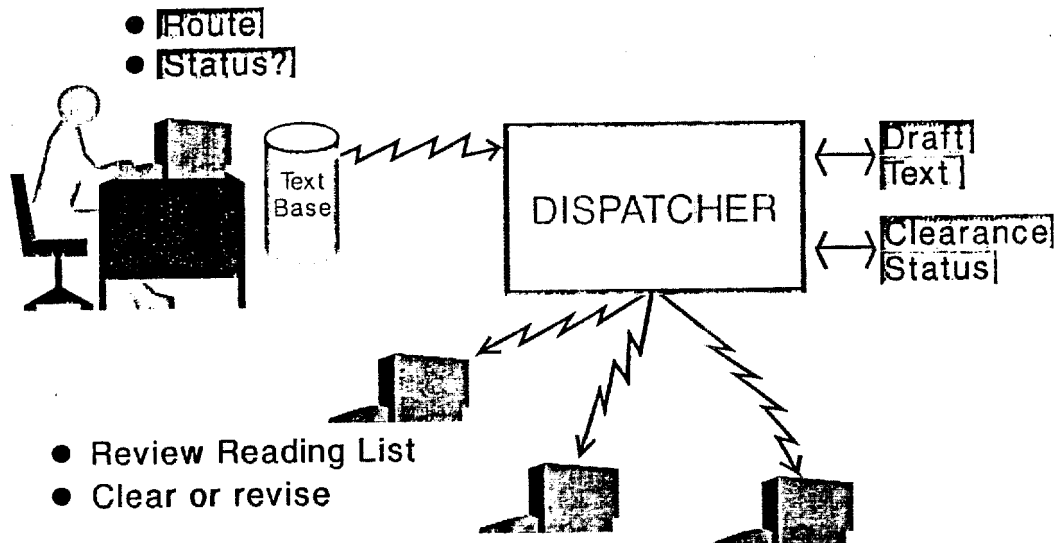
A word processor should not be limited to word processing--it must be linked as a terminal to a larger capacity computer. This computer can then distribute information to terminals and serve as a central electronic file cabinet for a multitude of offices.

A word processing device can perform beyond the meager tasks of creating and revising paper.

Let's follow integrated handling of information through a typical life cycle.

The first step in the life cycle is supported by the electronic capture of draft material in a temporary text base. Revisions and corrections can be made locally. Let's transmit this text to a central system where it can be shared for review.

COORDINATE AND CLEAR



Linked to a central system, the electronic product of drafting can be automatically routed and delivered for clearance before it is transmitted.

DISPATCHER is a software module. One of its functions is to look at clearance addressees and route draft text to appropriate terminals for review.

Reviewers have the option of signifying clearance, or of indicating revisions to text for an acceptable version.

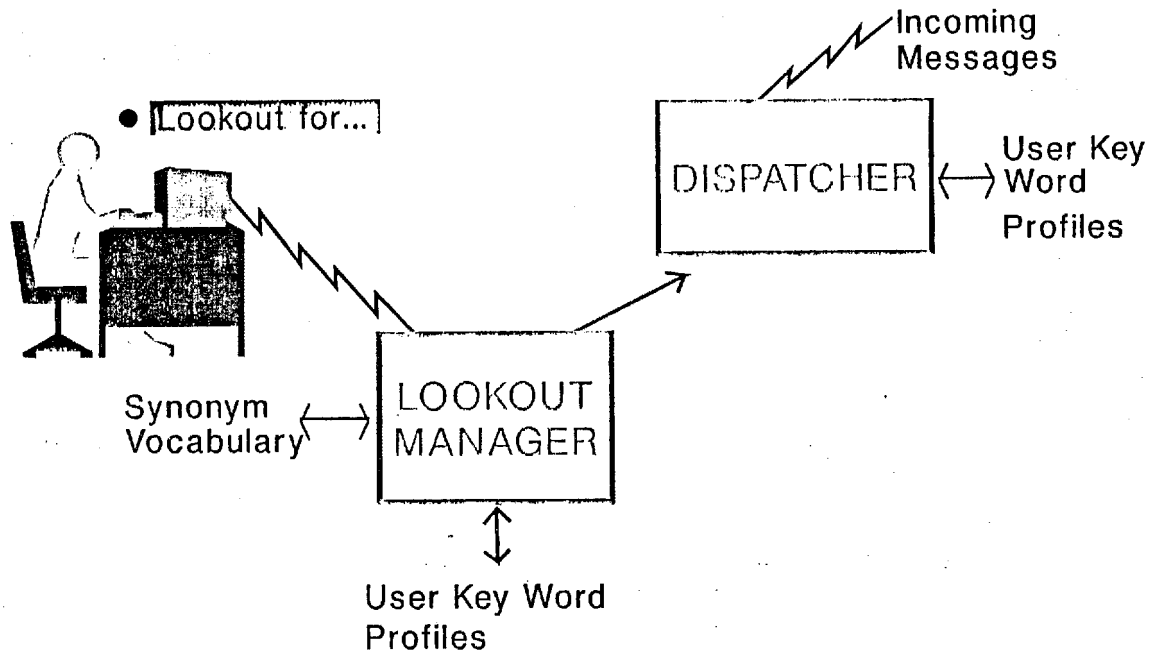
DISPATCHER also maintains the clearance status for all draft documents.

The originator can query DISPATCHER through a terminal and determine the clearance status of draft text. Those that have not yet cleared can be phoned and prompted to review pending material.

Importantly, these facilities will reduce the necessity for a secretary or staff assistant to non-productively "walk the hallways" and deliver papers for clearance.

Before this cleared document is communicated and distributed, let's look at how users can setup a lookout for types of information that they need.

WATCH FOR AND FORWARD



LOOKOUT MANAGER is another software module. Its function is to assist users in developing key words that define the types of information they wish to receive. LOOKOUT MANAGER then furnishes these key words or interest profiles to DISPATCHER.

Lacking specific routing indicators, DISPATCHER can use these profiles to watch for defined information and forward it to the requester.

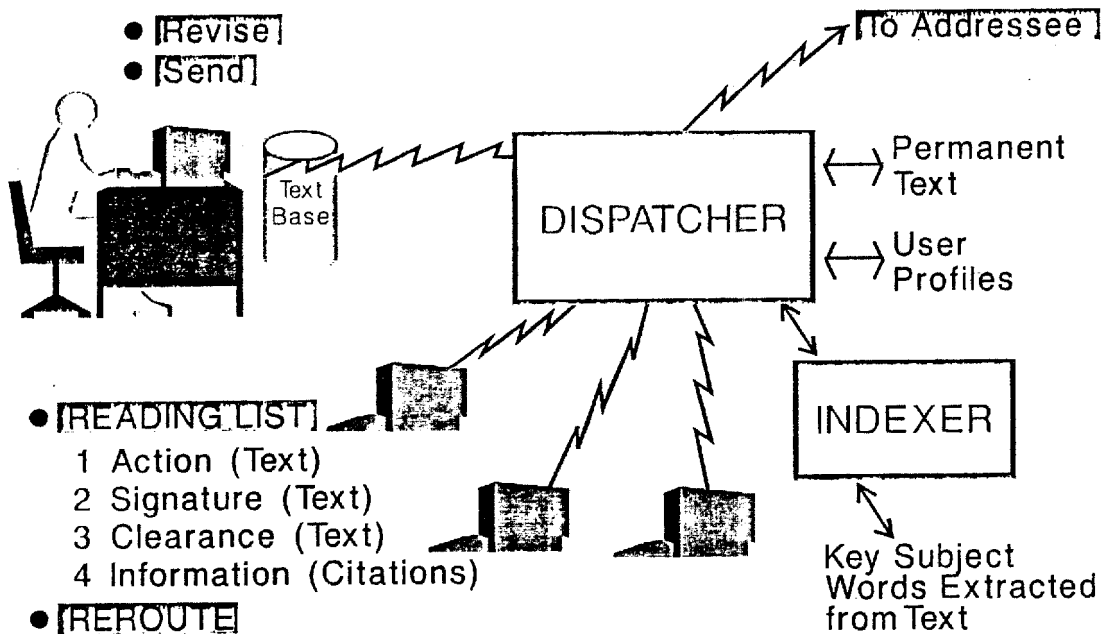
LOOKOUT MANAGER helps the user to:

- Build key word profiles of interest, or in effect index the user's subject interests.
- Automatically link these words with synonymous words.
- Pass the key words to dispatcher to watch for both incoming and outgoing messages.

This approach provides three key features:

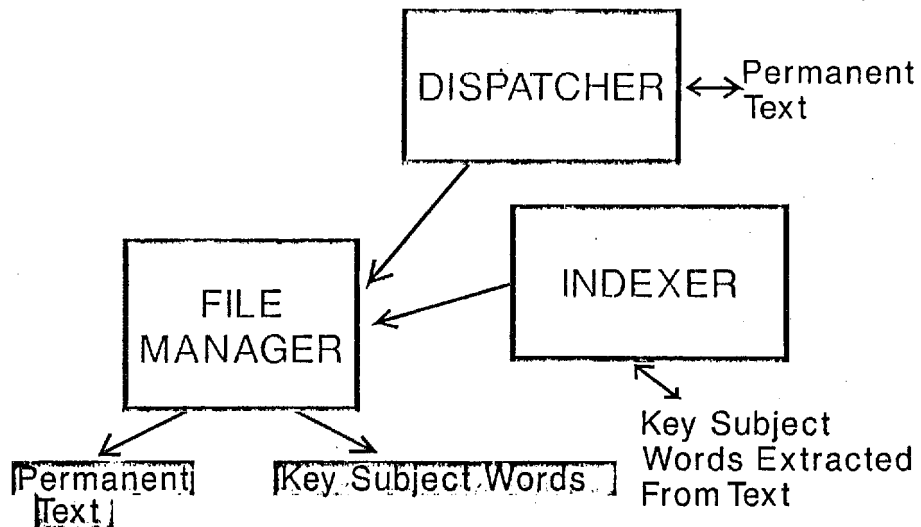
1. The potential for more consistency in distribution.
2. With distribution driven by profile tables, rather than software, users have the ability to quickly add or alter key word profiles and tailor how the system responds and reacts.
3. The linkage of synonym words such as aircraft, airplane, aviation, F-14, etc. minimizes the vagaries of language appearing in text and improves quality of distribution.

COMMUNICATE AND USE



Now, lets look at our message that has been cleared.

- The originator can revise the text and then send the cleared message through the system.
- DISPATCHER transmits the message to the addressee. Next, the text is passed to INDEXER -- an automated indexing module which extracts key subject words from message text.
- INDEXER then furnishes extracted words to DISPATCHER.
- DISPATCHER compares these words from text to user profiles, and makes distribution based on matching these interests to content.
- DISPATCHER also organizes user reading lists in priority order:
 - First is the full text of correspondence, memorandum, or messages assigned for action.
 - Next is the text of documents requiring signature.
 - This is followed by text of outgoing letters or messages requiring clearance initials.
 - And last are citations for those materials that have been routed for information interest.The first three items on the list may be produced as paper copies. After reviewing the list of info materials, paper copies can also be made. The paper need not be saved or filed. A user can always go back to the central electronic file cabinet, next week or next month, and obtain the same text.
- Users can also route and post to reading lists of other users.

SYSTEM MAINTAIN

After distribution has been made, messages must be filed and structured by key words for subsequent access.

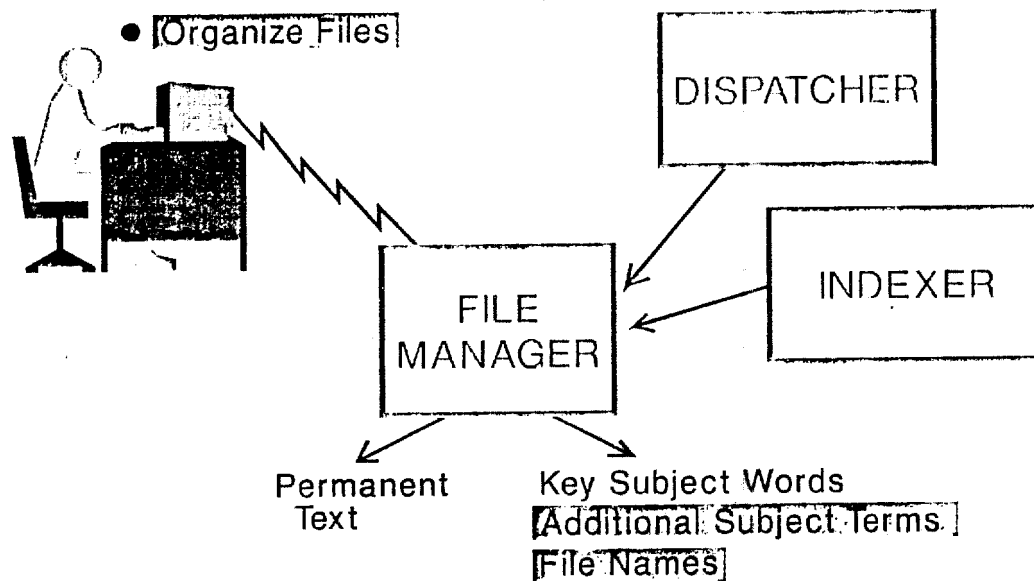
DISPATCHER passes the official communicated text to a software module called FILE MANAGER.

Key Subject Words, extracted from text by INDEXER, are also furnished to the FILE MANAGER.

Permanent text is stored, and Key Subject Words provide the facility for finding and recalling needed information.

FILE MANAGER provides a single, central, authoritative source for all official information. It significantly reduces the redundant filing and upkeep of a multitude of duplicate paper files in different offices. Where a single paper copy cannot be easily shared by multiple users, a single file of migratory electronic information can be shared and shared over great distances by remote terminals or word processors linked to the system.

USER MAIN TAIN



Global systems have their faults. They can't be all things to everybody.

So each user must be able to tailor files by organizing information to meet their own perspectives.

As an extension to key words extracted from text, users can organize files with:

- Additional Subject Terms, and
- File Names

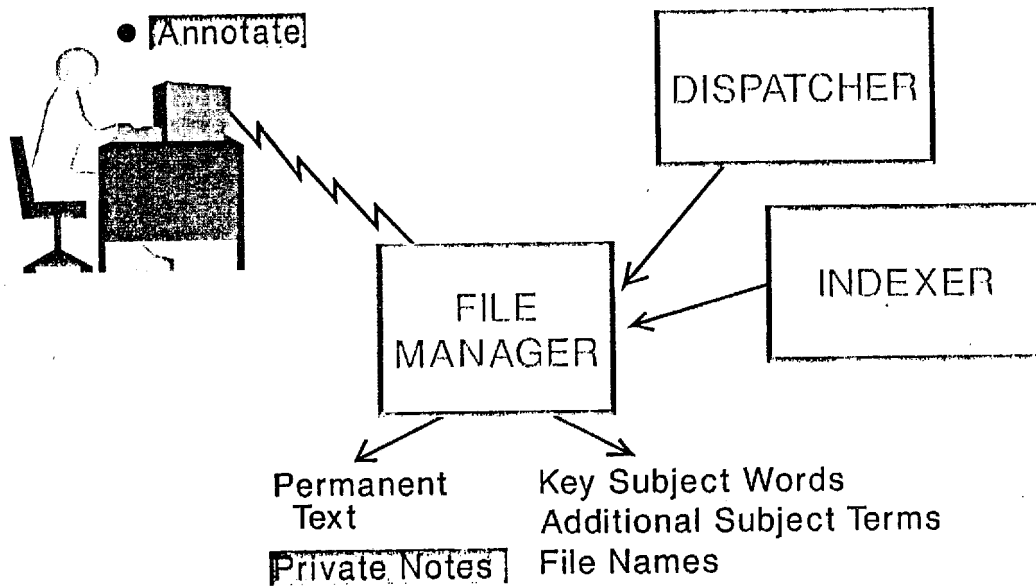
For example, "weapons smuggling" might have been extracted from text as key subject words. The user may also add "illegal arms shipment" or "export violations" and increase the ability to recall all information on a given subject. If users wished the facility, they may also add "gun running" and other convenient terminology.

The user may also place the message in files called "Illegal Arms Exports by Country X" and "Clandestine Arms Imports by Country Y".

With these features, the response of the system can be tailored by the user.

The system can meet broad "public" needs, i.e. central support to a wide range of users, or it can meet the more specific "private" needs of each user.

USER MAINTAIN



Another "private" feature is the ability to annotate information.

Cuff notes or marginal notes can be made to supplement information.

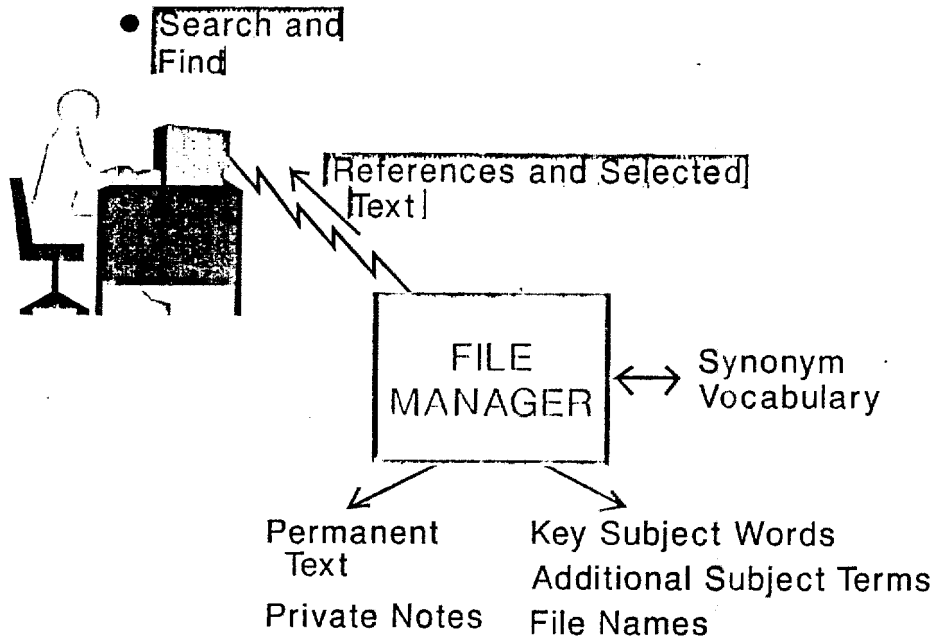
These notes can be private or open.

Open notes are comments to other users of the same information.

Private notes can only be viewed by writers or by those authorized access by the writer.

The ability to annotate increases the utility of a central information resource.

RECALL AND REUSE



As mentioned earlier, the system must also provide a single, central authoritative electronic file cabinet that can be shared by all users.

Access to this information can be controlled more effectively than an over abundance of paper copies.

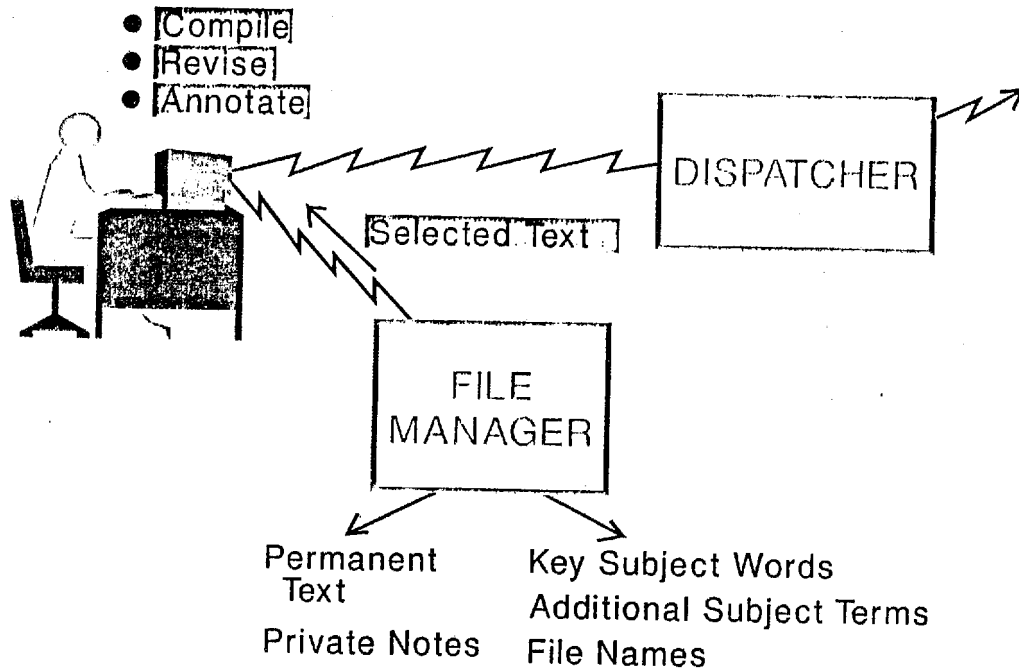
Importantly, 50 copies of the same document are not maintained in 50 different office files.

In addition to message characteristics such as date, originator, addressee, and message number, groups of related messages can be recalled by:

- Key subject words extracted by the system
- Additional subject terms provided by users
- And file names assigned by users

Users can review synoptic citations and then select the full text of relevant correspondence and documents.

REPACKAGE INFORMATION



Often the recall of information involves repackaging for other uses.

Selected text can be recalled from the file.

It can then be compiled and rearranged in a desired order.

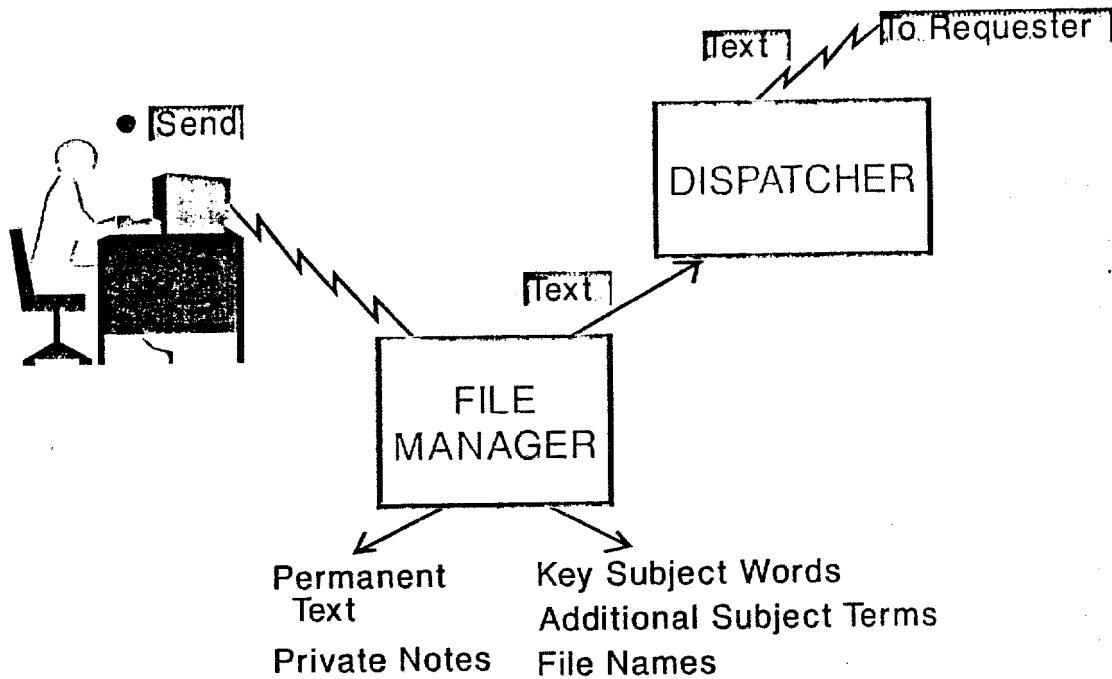
Revisions, consisting of deletions, changes, and insertions of new information, can be made.

Arithmetic functions can be applied to summarize details and calculate trends or relationships.

And graphic capabilities could also be applied to produce charts and other illustrations.

Using facilities of DISPATCHER, repackaged information can be sent electronically to recipients. Electronic publishing is thus a key feature of the automated life cycle system.

RECOMMUNICATE

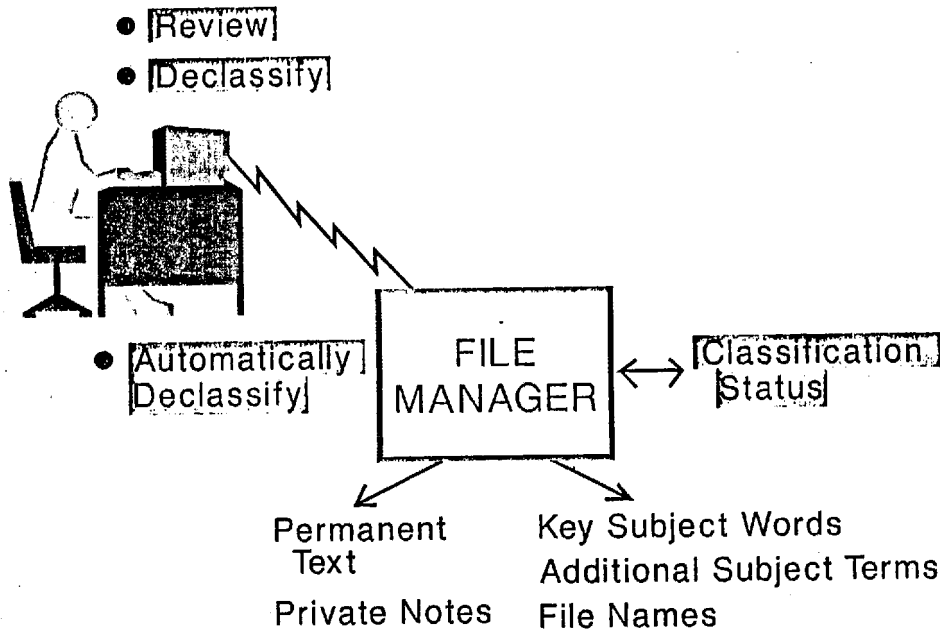


The recall of information from a file is often followed by the need to recommunicate this information.

Other parties may not have direct access to the central file, or they may not meet access requirements.

An authorized user can recall information and electronically send or forward it to a requester.

DECLASSIFY



Eventually, when information is no longer sensitive, it must be reviewed and declassified.

Automatic and general declassification schedules, assigned by originators, have already significantly offset demands for human review.

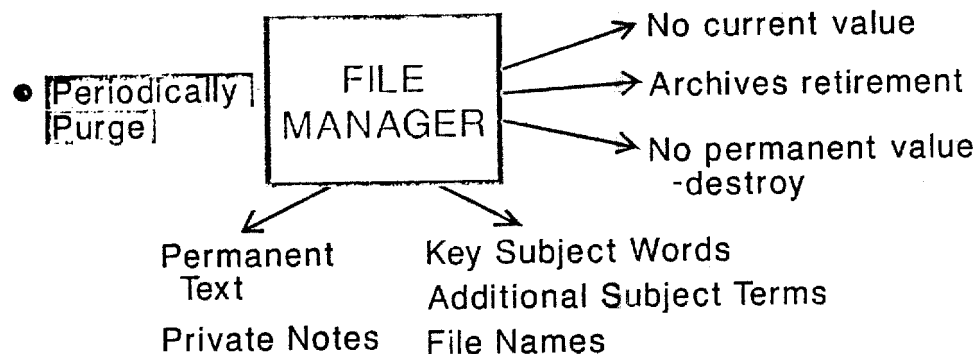
The system can use these designators for automatic classification changes, or the information base can be reviewed to make these declassification decisions.

A very important feature of automated support is a record of classification status -- the institutionalization of declassification activities with a single, central authoritative source for current classification status.

Contrast this feature with multiple copies of the same documents maintained in multiple offices and even multiple agencies.

It is virtually impossible to maintain correct, current classification status with proliferated paper copies.

DISPOSE



Finally, some disposition must be made of older information. The files must be periodically purged.

Screening and disposition of paper files is time consuming, and thus not frequently performed. There are always other more productive tasks that require attention.

With an indicator that represents value over time, the electronic storage system can provide a dynamic demise of information:

1. That which has no current use value must be removed to a less costly storage media which can be used for low frequency access.
2. Information that no longer has operational value must be repackaged and retired -- electronically -- to the archives.
3. And information that has no permanent value is destroyed.

We are now at or near the end of the information life cycle, save another important recycling and reuse at the National Archives. It makes sense that this new re-use cycle also be performed electronically. Wouldn't it be nice, as well as productive, if the home offices of Congressmen were equipped with coin operated terminals accessing information at the National Archives. Contrast this with a fare from California and a week of hotel bills to use today's paper files in Washington.

LET'S REVIEW THE LIFE CYCLE AND SUMMARIZE THE INTEGRATED SOLUTIONS THAT HAVE BEEN APPLIED.

INFORMATION LIFE CYCLE

- | | |
|-----------------|---------------------------------|
| ● CREATE | -WORD PROCESSING |
| ● COMMUNICATE | -END-TO-END ELECTRONIC EXCHANGE |
| ● USE | -AUTOMATED DISTRIBUTION |
| ● MAINTAIN | -AUTOMATED INDEXING |
| | -ELECTRONIC STORAGE |
| ● RECALL | -AUTOMATED SEARCHING |
| ● REUSE | -ELECTRONIC DELIVERY |
| ● REPACKAGE | -AUTOMATED SEARCHING |
| | WORD PROCESSING, MATH |
| ● RECOMMUNICATE | -ELECTRONIC FORWARDING |
| ● DECLASSIFY | -HUMAN AND AUTOMATED SCHEDULING |
| | |
| ● DISPOSE | -HUMAN AND AUTOMATED SCHEDULING |

Along the left side are the predictable steps through the information life cycle.

Opposite each step is the type of electronic solution that can be provided to support the work required.

Although such a life cycle system may not exist, many of the individual solutions are currently operational in different organizations.

Operating in such a fragmented and piecemeal manner, the benefits are marginal and increases in office productivity are probably negligible.

Maximum potential can be realized by:

1. Addressing the first step in the life cycle with word processing.
2. Exchanging this electronic information product with subsequent steps in the life cycle.

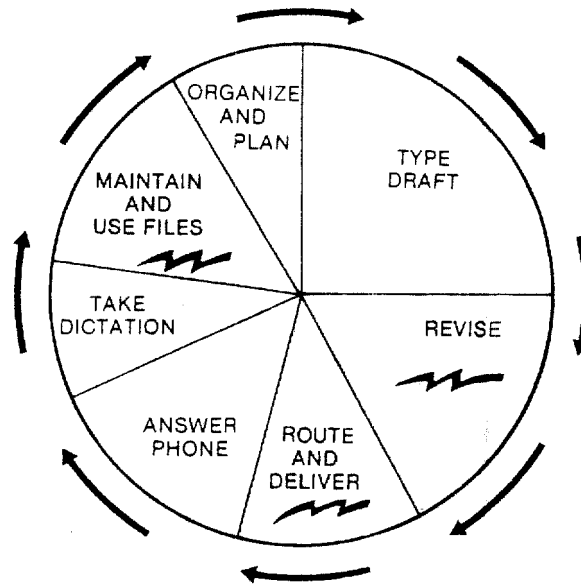
AND

3. Integrating these life cycle steps in a coherent architecture that addresses the fundamental tasks most often performed in the office.

This approach provides the leverage for increased human productivity.

MAJOR SECRETARIAL TASKS

EIGHT-HOUR DAY



The daily routine of a secretary often includes a number of unnecessary time consuming, and nonproductive tasks. These tasks produce a vicious 365 day cycle.

Word processing has helped to reduce the time and effort required for revising and retyping.

But secretaries still must walk the hallways to deliver important papers or obtain clearances for messages that must be transmitted quickly.

When a secretary is performing these delivery tasks, other more productive work is not being done. And the boss becomes the telephone operator, unless two secretaries are employed to insure coverage.

There is also time wasted in filing and trying to find misfiled or unfiled papers.

Performance of these routine tasks by a system, such as the one we have just reviewed, can give at least 20 percent more time to a secretary or other information worker in the office.

Positions may or may not be saved, but demands for additional positions can be reduced.

PAPER MEDIA

- NO ECONOMIES OF SCALE
- HUMAN RESOURCE
INTENSIVE
- REDUNDANT-OVERLAPPING
COSTS
- UNMANAGEABLE

It is clear that paper media, of any volume, will increase burdens.

As the volume of paper grows, greater demands will be made for human resources.

Paper, copying capabilities, and the physical dispersion of users do not facilitate sharing of a single paper resource.

Paper breeds duplication and demands redundant investments.

Paper is labor intensive.

Paper cannot be effectively managed.

BUT THERE IS A WAY TO HAVE OUR INFORMATION CAKE AND EAT IT TOO -- SUSTAIN THE VALUE WHILE REDUCING THE BURDENS!

ELECTRONIC MEDIA

- INCREASED CAPABILITIES
-LEVERAGE
- INCREASED CAPACITIES
- DECREASING COSTS
- LESS DEMANDING OF
HUMAN RESOURCES
- MORE CONTROLLABLE
- MORE TIMELY

This is the capital intensive option to reducing demands for human resources in the office.

Most of these benefits can be achieved through increased human productivity offered by electronic media applied to the life cycle.

Value may also be increased by making information more timely.

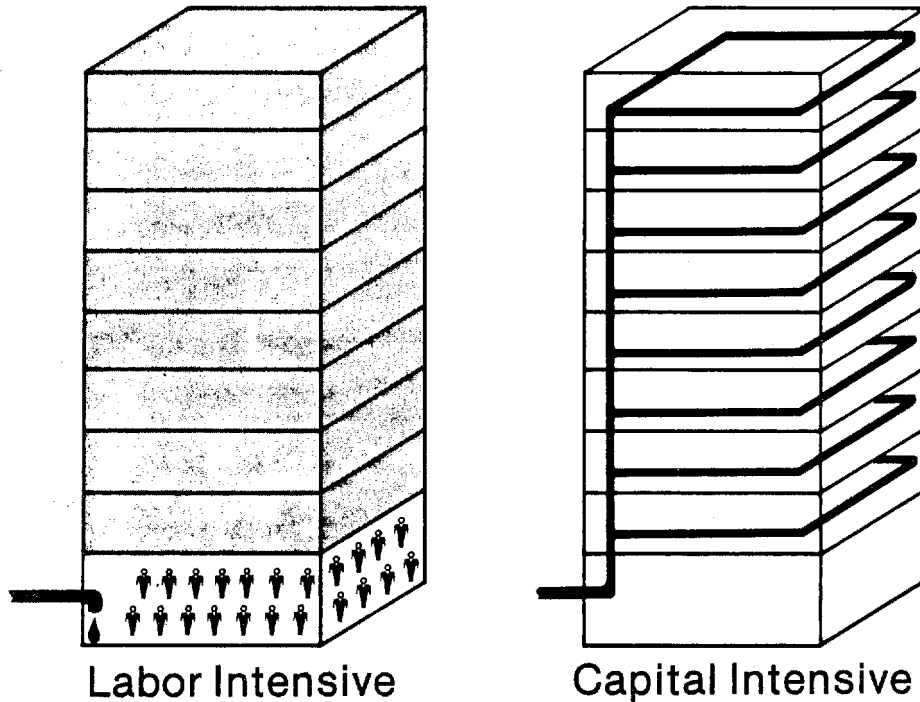
Most of these benefits, offered by electronic media, can reduce human resource burdens and increase productivity.

However, these benefits can only be fully realized by addressing the information life cycle as a continuous process. The solutions must be integrated -- they must be coherent.

Briefly stated, any system that doesn't address the fundamental tasks most often performed in the office isn't worth the floor space that it occupies.

Let's look at another segment of industry to see if similar capital intensive approaches to the problem are viable.

DISTRIBUTION



How many of you have recently seen a multistory hotel like the one illustrated on the left?

The water supply terminates at one location.

And how does the water get to each room? Dozens of water carriers or bellboys are required for delivery.

The simple and practical solution is the modern approach shown to the right.

Each room has a water faucet.

With plumbing, there is end-to-end delivery of water directly from the water supply to the user. Labor intensive methods have been replaced by a productive capital intensive solution.

Picture information in the place of water in both illustrations. Offices need information faucets to replace human resource intensive methods.

SPEED OF EXCHANGE

DELIVERY
250 feet per day!



But the office must have inherited bellboys when plumbing was installed in hotels.

Electronic information can travel at 186,000 miles per second -- faster than water -- but paper is still the information flotsam of the office.

Paper demands human resources, and demands minimal contribution available from these resources.

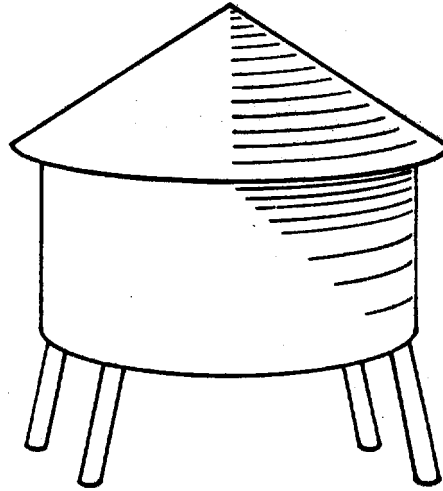
Paper loves people.

This analogy for distribution naturally leads to a similar one for the file cabinet.

STORAGE



Labor Intensive



Capital Intensive

To the left, the washbowl and pitcher represent the file cabinets in today's offices.

And if you dwell on it for a moment, our present day information practices differ little from this pre-plumbing era.

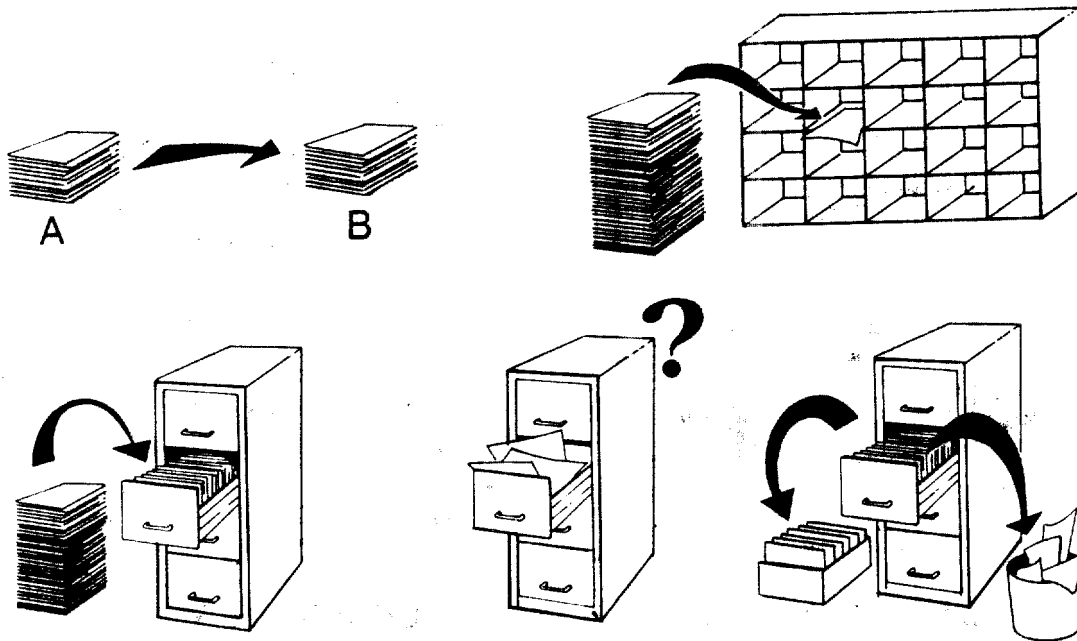
Both information and water are critical to human functioning.

The water tank on the right is a central supply. It could be a storage tank for information.

The water industry has gone a long way toward solving its storage and distribution problems.

The same can be done for information!

NONPRODUCTIVE TASKS



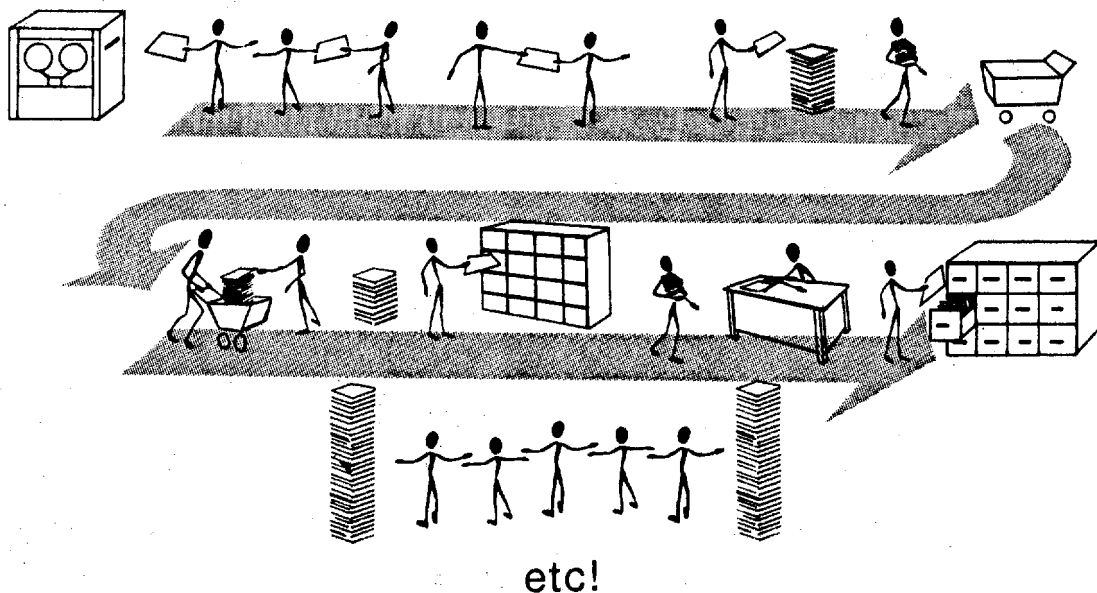
Let's look at the problem another way.

Moving paper from point A to point B is not a productive task. Even if output increases from 3,000 to 5,000 pages per day, using humans to move paper is still not productive.

The same applies to other labor intensive paper moving tasks:

- Sorting and distributing papers
- Filing papers
- Trying to find misfiled papers
- And then, trying to purge files of papers which no longer have value.

INEFFECTIVE USE OF HUMAN RESOURCES

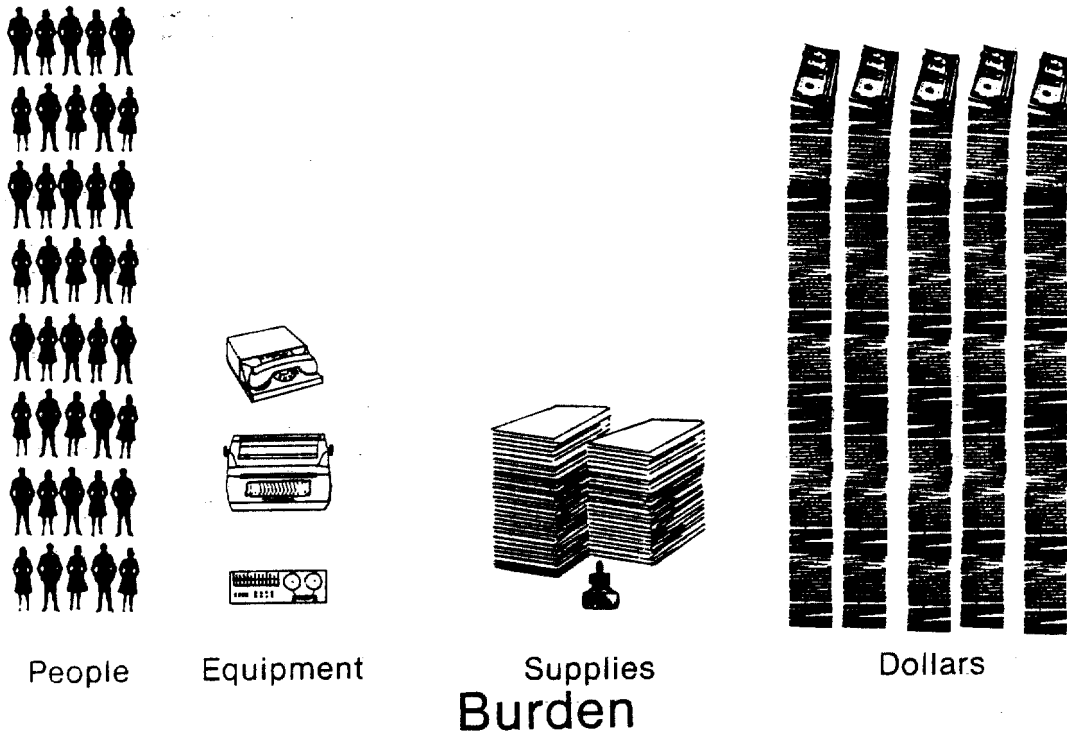


The bucket brigade, the human chain for moving information on paper is not an effective use of human resources.

This process can hardly be described as the most productive contribution of human effort.

Information can and must be moved more efficiently.

INFORMATION RESOURCES



The most costly information resource is the human element -- the people engaged in the information process.

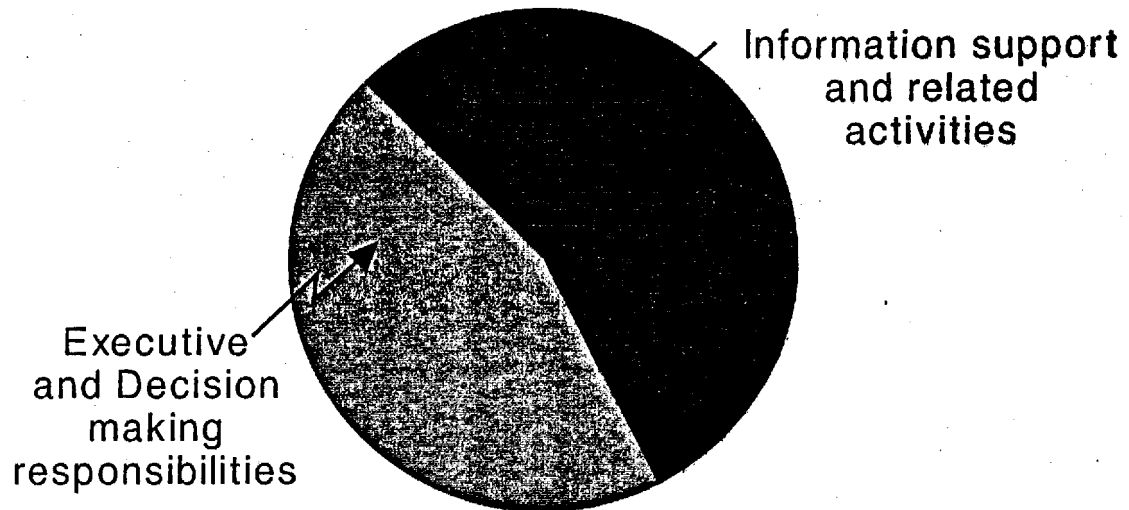
Most processes are labor intensive -- not capital intensive.

Clerical costs have risen by 76 per cent from 1972 to 1982.

These costs are incurred year after year -- and they continue to escalate.

Given the right tools, a greater contribution can be made by these important resources.

THE MAGNITUDE



The human resources consumed by information activities are not trivial.

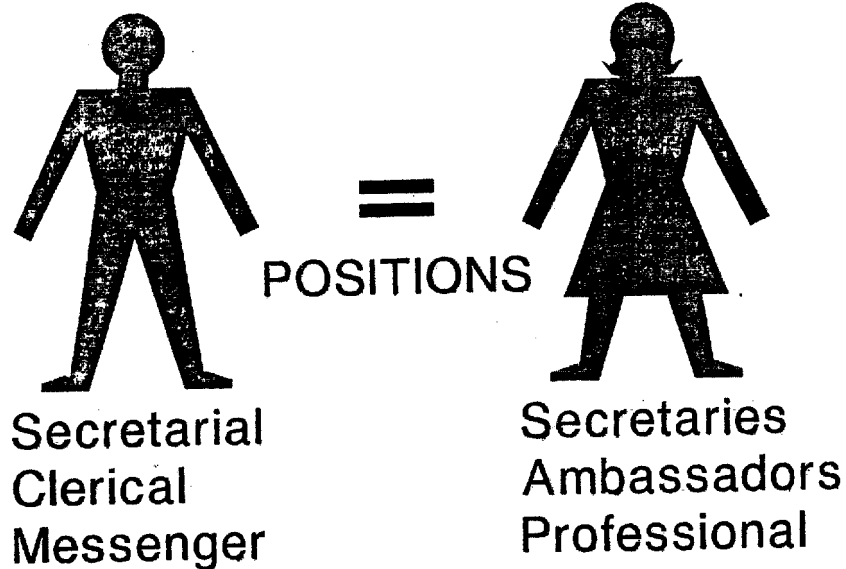
If 50 percent of the national workforce is engaged in information or information related activities, then the non-industrial, non-farming Federal work force must be comparable.

The information intermediaries -- the processors, the handlers, the filters, the digestors, the repackagers, and the presentors -- to name but a few -- can easily account for over half the human resources in a federal agency.

Information activities are dominating, and they are pervading.

The human resources demanded are substantial.

PERSONNEL CEILINGS



A most significant factor in our government environment is the position ceiling.

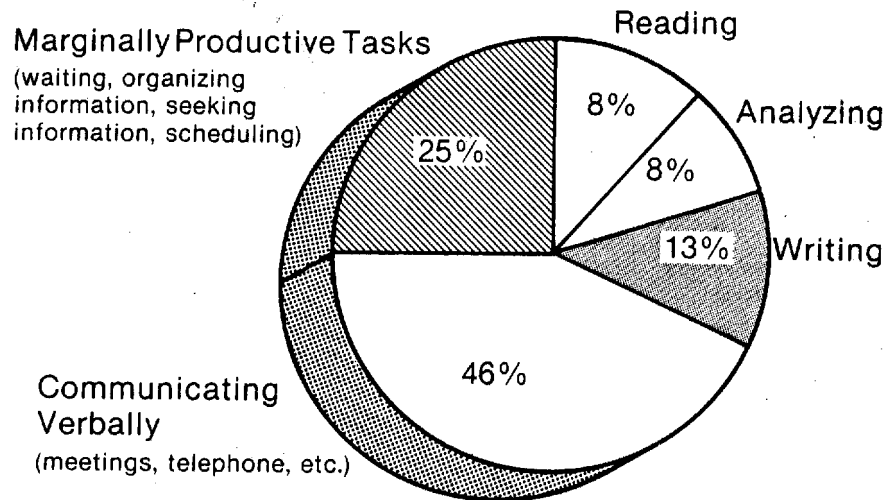
A clerical position counts the same as that for the Secretary of State, an Ambassador, or a professional. Each position counts one against the ceiling.

The choice is between human resource intensive paper media and capital intensive electronic movement and processing of information.

Will valuable human resources continue to be used to push and process information on paper -- or will these activities be performed electronically to reallocate scarce position resources for more productive and result oriented jobs?

Electronic information media is the leverage and the torque that can provide the basis for better allocation and more effective utilization of valuable human resources.

KNOWLEDGE WORKER



he office secretary is not alone in coping with nonproductive tasks.

The knowledge worker -- the decisionmaker -- is also faced with these problems.

Less productive tasks could be reduced with more efficient information processes.

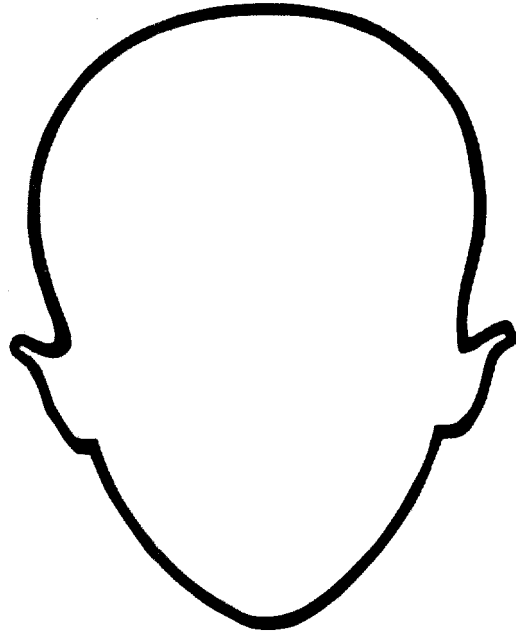
Efficient processes could provide more time for reading and analyzing information as well as more time for expressing and time binding new knowledge in writing.

Verbal communications -- the exchange of information and knowledge -- tend not to be preserved for others.

But these issues deal with process and efficiency. More important is the goal of executive effectiveness.

INFORMATION VALUE

The reactor in
country X will
be capable of
producing
plutonium by
1985

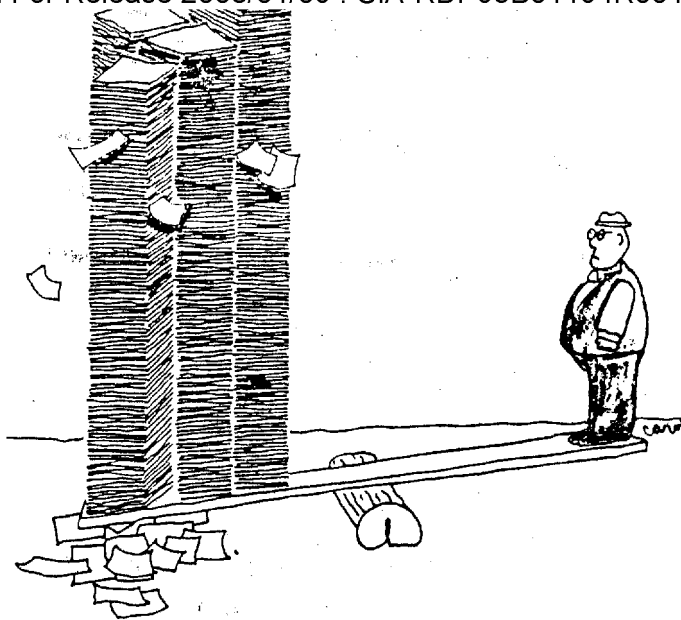


Effectiveness is derived from the value contribution of information.

With decisionmakers, effectiveness is more important than efficiency.

Often times, appropriate decisions are dependent on the right information at the right time -- and this information must be organized, structured and packaged in a manner that will facilitate the right decisions.

In addition to reducing burdens that arise from the paper bound process, solutions must also focus on the information itself and its contribution to the "intelligent office".



More paper as a media for exchanging and using information will only demand more human resources, decrease productivity, and increase burdens.

Paper cannot be handled efficiently, but information can.

Effectiveness is derived from information -- not paper.

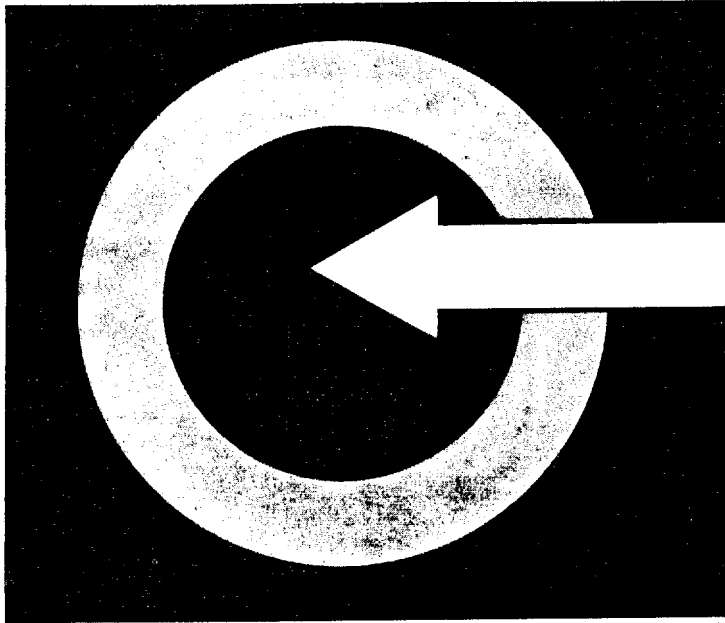
DOING MORE WITH LESS

Electronic technology is drastically decreasing in cost and at the same time offering more capabilities -- more leverage.

If applied in an integrated manner to life cycle activities.

- Productivity of both the office worker and the professional knowledge worker can be increased.
- Burdens -- especially human resource -- can be reduced.
- And value of information contribution can be sustained and even increased.

IT'S A SMARTER WAY OF ACCOMPLISHING OUR INFORMATION MANAGEMENT OBJECTIVE WITH...



THE INTELLIGENT ORGANIZATION

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